

A LITTLE YELLOW INFECTION CONTROL BOOK

URINARY TRACT INFECTION

**YES, IT IS A BACTERIURIA -
BUT IS IT A SYMPTOMATIC UTI?**



**Grampians Region Infection Control Group
2019**

ABOUT THIS BOOK

Urinary tract infections are the second most common infection occurring in residential aged care facilities.

Inappropriate use of antimicrobials, particularly the treatment of asymptomatic bacteriuria is a common finding in studies of infections in residential aged care facilities.

Overtreatment of UTI leads to higher health care costs, increased antibiotic exposure, a greater number of adverse reactions, antimicrobial resistance, and other unintended outcomes, such as *Clostridium difficile* infection.

The urinary tract infection booklet is designed to assist residential care staff accurately identify urinary tract infections in their residents.

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SYMPTOMATIC UTI - typical clinical presentation

NO indwelling catheter

For residents **without** an indwelling urinary catheter

At least ONE criterion must be present

1. Acute dysuria or acute pain, swelling or tenderness of the testes, epididymis or prostate
2. *Fever* or *leucocytosis* & one localised urinary tract sub criteria
3. In the absence of fever or *leucocytosis*, two or more localised urinary tract sub criteria

DEFINITIONS - Clinical presentation

Fever

Single tympanic temperature $>38.1^{\circ}\text{C}$

Single oral temperature $>37.8^{\circ}\text{C}$

Repeated oral temperatures $>37.2^{\circ}\text{C}$ or rectal temperatures $>37.5^{\circ}\text{C}$

Single temperature $>1.1^{\circ}\text{C}$ over baseline from any site (oral, tympanic, axillary)

Leucocytosis *As according to full blood examination (FBE) results*

Neutrophilia ($>7.5 \times 10^9/\text{g/L}$) Neutrophils are a common type of leucocyte.

Left shift ($>6\%$ bands or $\geq 1,500$ bands/ mm^3)

(left shift = increase in no. of immature leukocytes in the peripheral blood)

Localised urinary tract sub-criteria

For residents with *NO indwelling catheter only* - acute costovertebral angle pain or tenderness

Supra-pubic pain

Gross haematuria

New or marked increase in incontinence

New or marked increase in urgency

New or marked increase in frequency

SYMPTOMATIC UTI- typical clinical presentation

INDWELLING catheter

For residents **with** an indwelling urinary catheter

At least ONE criterion must be present

1. *Fever*, rigors or new onset hypotension, with no alternate site of infection
2. Either acute change in mental status or acute functional decline, with no alternate diagnosis & *leucocytosis*.
3. New onset supra-pubic pain or costo-vertebral angle pain or tenderness
4. Purulent discharge from around the catheter or acute pain, swelling or tenderness of the testes, epididymis or prostate.

(Modified McGeer Definitions - Surveillance Definitions of Infections in Long-Term Care Facilities: Revisiting the McGeer Criteria. Infection Control and Hospital Epidemiology, Vol. 33, No. 10 (October 2012), 965- 977)



FLOW CHART FOR:

SYMPTOMATIC Urinary Tract Infection

Action:

- Increase fluid intake (unless on fluid restrictions)
- Perform urinary dipstick test—record results
- Notify GP with an immediacy dictated by the client's condition
- Obtain MSU/CSU as ordered by GP - BEFORE antibiotics are commenced
- Depending on severity of infection GP may order antibiotics while awaiting culture and sensitivity results
- Follow medical management plan
- Check culture results to ensure organism is susceptible to initial prescribed antibiotic.



ASYMPTOMATIC BACTERIURIA

The diagnosis of asymptomatic bacteriuria should be based on culture of a urine specimen collected in a manner that minimizes contamination.

- Asymptomatic women - 2 consecutive voided urine specimens with isolation of the same bacterial strain $\geq 10^5$ cfu/mL.
- Asymptomatic men - single, clean-catch, voided urine specimen with 1 bacterial species isolated $\geq 10^5$ cfu/mL identifies bacteriuria.
- A single catheterized urine specimen with 1 bacterial species isolated $\geq 10^2$ cfu/mL identified bacteriuria in women or men.

Pyuria accompanying asymptomatic bacteriuria is not an indication for antibiotic treatment.

- For residents without indwelling catheters, up to 40% of women and 20% of men have asymptomatic bacteriuria at any time
- Residents managed with long-term indwelling catheters are universally bacteriuric because of biofilm formation along the catheter
- The presence of asymptomatic bacteriuria is **NOT** an indication for antibiotic administration in the absence of localising clinical features in the genitourinary tract.

FLOW CHART FOR:

ASYMPTOMATIC Bacteriuria

Action:

- Increase fluid intake (unless on fluid restrictions)
- Perform urinary dipstick test
- Report to GP (only take MSU if directed by GP)
- If GP diagnoses asymptomatic bacteriuria ensure this is recorded in medical record as asymptomatic bacteriuria are not counted in infection surveillance records
- Follow medical management plan
- No further urinary dipstick tests are required if the smelly or turbid urine state becomes chronic.



Urine Dipsticks

Limitations and Values



ROUTINE DIPSTICK TESTS ARE NOT NECESSARY

Because residents often have a high background rate of asymptomatic bacteriuria/pyuria there no place for routine dipstick screening.

Positive nitrites/leucocytes will be present in that percentage of residents who have symptomatic bacteriuria.

Dipsticks can be useful if a UTI is suspected.

Note:

- Urine dipsticks have a finite lifespan (check use by date) and must be stored in a closed container. Use of outdated and improperly stored materials can lead to erroneous results.
- Always replace lid after use
- Dipstick testing must be correlated with clinical signs and symptoms and urine culture results.

Interpreting Urine Tests

(1) Urine Dipstick

Treatment of a UTI should never be initiated based upon dipstick urinalysis alone; clinical signs and symptoms and subsequent urine culture results are vital in diagnosing UTI.

1a Nitrites

A dipstick positive for nitrites can indicate the presence of a UTI. A positive result is highly specific for bacterial infection, but a negative test does not exclude infection.

1b Leukocytes

A dipstick positive for leukocyte esterase can indicate the presence of a UTI. Pyuria, white blood cells in the urine, indicates the presence of inflammation. However, pyuria does not necessarily mean that the inflammation is a result of infection. The absence of leukocyte esterase virtually eliminates infection as a cause. (negative predictive value of nearly 90%).

1c Haematuria

Haematuria is common in infection, however the dipstick test for blood is very sensitive and the few RBCs that normally inhabit the urine can give a trace reading. There are many reasons for detecting blood in the urine.

1d Urine Specific Gravity

Specific gravity (SG) <1.008 is dilute and >1.020 is concentrated.

1e Urinary pH

The range is 4.5 to 8, but urine is commonly acidic (ie 5.5-6.5) due to metabolic activity.

pH may be increased (more alkaline) if urea-splitting organisms e.g. *Proteus mirabilis* is present, but there are many causes of alkaline urine.

Interpreting Urine Tests Cont'd



Note:

A **negative** dipstick test makes UTI unlikely but does not definitely exclude it.

A **positive** dipstick test does not indicate a symptomatic UTI nor the need for antibiotic therapy in the absence of localising features in the genitourinary tract.

Nitrite	Leuks	Blood	Protein	Result	Possible Actions
+	+	+	+/-	Likely UTI	MSU specimen Empiric antibiotics
+	-	-	-	Likely UTI	MSU specimen Empiric antibiotics
-	+	-	-	UTI or other likely	Treat if severe Consider delay if OK Culture urine
-	-	+/-	+/-	UTI unlikely	No UTI—do not treat Consider other cause

Positive dipstick but ASYMPTOMATIC

- **DO NOT** send urine for culture
- **DO NOT** treat with antimicrobials
- **Monitor** for localised urinary tract clinical features

Note:

Urine odour or turbidity alone is not indicative of symptomatic UTI and is no reason to test urine.

A strong odour may be the result of a concentrated specimen rather than a urinary tract infection.

Cloudy urine is expected in all residents with a urinary catheter.



Mid Stream Urine Specimen for microscopy and culture

A mid-stream urine (MSU) sample means that you don't collect the first part of urine that comes out or the last part. This reduces the risk of the sample being contaminated with bacteria from the skin around the urethra.

- Obtain the "cleanest catch" specimen possible
- Transfer to specimen container within a few minutes
- Transfer to pathology within 30 minutes
- If transfer to pathology delayed refrigerate at 4°C as soon as possible
- Microscopy results (without culture) should be available within 2 hours.

(2) Microbiological Results



NO indwelling catheter

- At least 10^5 cfu/mL or 10^8 cfu/L of no more than two species of microorganism in a voided urine sample
- At least 10^2 cfu/mL or 10^5 cfu/L of any number of organisms in a specimen collected by in & out catheter.

Indwelling catheter

- Urinary catheter specimen culture with at least 10^5 cfu/mL or 10^8 cfu/L of any organism(s).

Do not investigate or treat cloudy or malodorous urine in aged-care facility residents who do not have other symptoms or signs of UTI.

Antibiotics Prescribed

Antibiotics may/may not be ordered depending on the resident's condition.

Microbiological Result

Antibiotic therapy should be guided by susceptibility results.

Early treatment failure can be due to a resistant organism.

Possible actions following receipt of results:

1. Not a significant result & antibiotics stopped or not initiated.
2. Significant result & organism is susceptible to initial prescribed antibiotic(s)
3. Significant result & organism is not susceptible to initial prescribed antibiotic(s). Appropriate antibiotic(s) commenced.
4. UTI classified as a recurrent infection:

Definitions:

Recurrent UTI:

- ⇒ Women - **3 or more** culture confirmed UTIs in **1 year** with the same or different organisms, **or**
- ⇒ Women - **2 or more** culture confirmed UTIs in **6 months** with the same or different organisms
- ⇒ Men - **1 or more** confirmed UTIs

Relapse UTI

Repeat infection with the same infecting organism, usually occurring within 4 weeks of previous UTI
(Within 2 weeks is often suggestive of failure of initial treatment)

See TGA for different recommendations re recurrent infection

**DO NOT FORGET TO DOCUMENT ALL CLINICAL
FEATURES, OBSERVATIONS, TREATMENT AND TEST
RESULTS IN RESIDENTS NOTES**

Therapeutic Guidelines Antibiotic Recommendations:

Acute cystitis

Female

For **empirical therapy** of acute uncomplicated cystitis in **non-pregnant women**, use:

1. Trimethoprim* 300 mg orally, daily for 3 days (first line therapy)

Or

2. Nitrofurantoin**^ 100 mg orally, 6-hourly for 5 days (second line therapy)

If trimethoprim and nitrofurantoin cannot be used, use cefalexin 500 mg orally, 12-hourly for 5 days

Male

For **empirical therapy** of acute cystitis in **men** in whom prostatitis is unlikely use:

1. Trimethoprim* 300 mg orally, daily for 7 days (first line therapy),

or

2. Nitrofurantoin**^ 100 mg orally, 6-hourly for 7 days (second line therapy)

If Trimethoprim and Nitrofurantoin cannot be used, use Cefalexin 500 mg orally, 12-hourly for 7 days.

Notes:

*If the patient has been treated with trimethoprim in the previous 3 months, or had a trimethoprim-resistant *Escherichia coli* isolate during this time, use an alternative antibiotic for empirical therapy.

** Do not use nitrofurantoin unless the patient is afebrile and prostatitis is considered unlikely, because therapeutic concentrations of nitrofurantoin are not reached in the prostate.

^ An alternative regimen is 100 mg 12-hourly for 5 days. This is from a study using Macrobid®, a formulation unavailable in Australia. The Macrobid product information states that urine concentrations from this product are similar to those obtained with formulations available in Australia, however no data are available to confirm this claim.

Reference

Antibiotic Expert Group. *Therapeutic Guidelines: Antibiotic* Version 16. Melbourne: Therapeutic Guidelines Limited: 2019

Definitions:

Asymptomatic Bacteriuria (Asymptomatic UTI)

Presence of bacteria/white blood cells (positive dipstick); possibly smelly, turbid urine; **BUT absence of localised signs and symptoms**

The diagnosis of asymptomatic bacteriuria should be based on culture of a urine specimen collected in a manner that minimizes contamination.

Bacteriuria

Presence of bacteria in the urine not due to contamination from urine sample collection. May or may not cause symptoms of UTI.

Catheter-Associated Bacteriuria

Patients with indwelling urinary catheters (particularly long-term catheters) will inevitably develop bacteriuria and cloudy urine however they may not have a symptomatic UTI.

Cystitis

Inflammation of the bladder.

Prostatitis

Inflammation of the prostate gland.

Pyelonephritis

Inflammation of the renal parenchyma, calyces and pelvis.

Pyuria

Presence of/increased numbers of white blood cells in the urine; either alone or frequently associated with presence of bacteria.
(>5-10 wbc/hpf)

Symptomatic UTI

A UTI which relies for diagnosis on clinical features localising to the genitourinary tract (see page 4-5):

- Onset or worsening of urinary features
- Positive urine culture—number and type of bacteria and presence of significant white blood cells.

Recommended review of antimicrobial prescriptions :

- Empirical therapy at 48 to 72 hours.
 - ALL antimicrobial prescriptions at 7 days.
 - All ongoing antimicrobial prescriptions at least monthly.
 - For antimicrobial prescriptions exceeding 6 months enlist expert advice.
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Cartoons in this booklet by

<http://www.davegibb.com.au/index.htm>



Resources

For other booklets and resources visit the Grampians Region Health Collaborative Website—Infection Control at:

<http://www.grhc.org.au/infection-control>

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